

(19) 世界知的所有権機関
国際事務局



(43) 国際公開日
2003 年 10 月 23 日 (23.10.2003)

PCT

(10) 国際公開番号
WO 03/088365 A1

(51) 国際特許分類: H01L 29/78, 21/336, 29/49, 21/28

(21) 国際出願番号: PCT/JP03/04814

(22) 国際出願日: 2003 年 4 月 16 日 (16.04.2003)

(25) 国際出願の言語: 日本語

(26) 国際公開の言語: 日本語

(30) 優先権データ:
特願2002-115037 2002 年 4 月 17 日 (17.04.2002) JP

(71) 出願人 (米国を除く全ての指定国について): 松下電
器産業株式会社 (MATSUSHITA ELECTRIC INDUS-
TRIAL CO., LTD.) [JP/JP]: 〒571-8501 大阪府 門真市
大字門真 1 0 0 6 番地 Osaka (JP).

(72) 発明者: および

(75) 発明者/出願人 (米国についてのみ): 高木 剛 (TAK-
AGI, Takeshi) [JP/JP]: 〒616-8182 京都府 京都市 右京
区太秦北路町 3-3 Kyoto (JP).

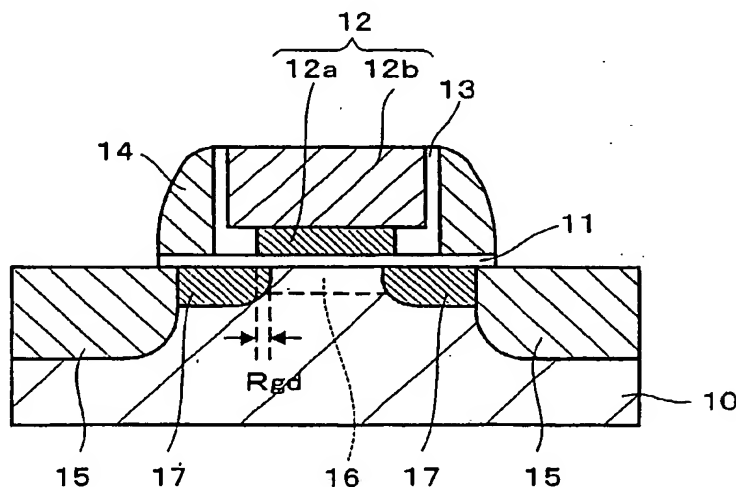
(74) 代理人: 三枝 英二, 外 (SAEGUSA, Eiji et al.): 〒
541-0045 大阪府 大阪市 中央区道修町 1-7-1 北浜
T N K ビル Osaka (JP).

(81) 指定国 (国内): AE, AG, AL, AM, AT, AU, AZ, BA, BB,
BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK,
DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU,
ID, IL, IN, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT,
LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO,
NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL,
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU,
ZA, ZM, ZW.

[続葉有]

(54) Title: SEMICONDUCTOR DEVICE AND ITS MANUFACTURING METHOD

(54) 発明の名称: 半導体装置及びその製造方法



(57) Abstract: A method for manufacturing a semiconductor device comprising the step of forming a lower gate electrode film on a semiconductor substrate (10) via a gate insulation film (11), forming an upper gate electrode film consisting of a material which is oxidized more slowly than this lower gate electrode film, patterning the upper and lower gate electrode films to form a gate electrode (12) having a lower gate electrode (12a) and an upper gate electrode (12b), introducing an impurity into the semiconductor substrate (10) to form a source/drain region (15), and oxidizing the side face of the lower gate electrode (12a) and that of the upper gate electrode (12b) to form an oxide film side wall (13) thicker in the gate length direction in the side of the lower gate electrode (12a) than in the gate length direction in the side of the upper gate electrode (12b).

[続葉有]

WO 03/088365 A1



(84) 指定国 (広域): ARIPO 特許 (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), ユーラシア特許 (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), ヨーロッパ特許 (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI 特許 (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

添付公開書類:

— 国際調査報告書

2文字コード及び他の略語については、定期発行される各PCTガゼットの巻頭に掲載されている「コードと略語のガイダンスノート」を参照。

(57) 要約: 半導体基板 10 上に、ゲート絶縁膜 11 を介して下部ゲート電極膜を形成する工程と、下部ゲート電極膜上に、この下部ゲート電極膜よりも酸化速度の遅い材料からなる上部ゲート電極膜を形成する工程と、上部ゲート電極膜及び下部ゲート電極膜をパターンニングして、下部ゲート電極 12a 及び上部ゲート電極 12b を有するゲート電極 12 を形成する工程と、半導体基板 10 に不純物を導入してソース・ドレイン領域 15 を形成する工程と、下部ゲート電極 12a 及び上部ゲート電極 12b の側面を酸化し、下部ゲート電極 12a の側方におけるゲート長方向の厚さが、上部ゲート電極 12b の側方におけるゲート長方向の厚さよりも大きい酸化膜サイドウォール 13 を形成する工程とを備えている半導体装置の製造方法。

PATENT COOPERATION TREATY

PCT

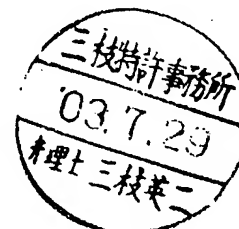
NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

From the INTERNATIONAL BUREAU

To:

SAEGUSA, Eiji
Kitahama TNK Building
1-7-1, Doshomachi, Chuo-ku
Osaka-shi, Osaka 541-0045
Japan



Date of mailing (day/month/year) 18 July 2003 (18.07.03)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference P03-20	
International application No. PCT/JP03/04814	
International publication date (day/month/year) Not yet published	
	International filing date (day/month/year) 16 April 2003 (16.04.03)
	Priority date (day/month/year) 17 April 2002 (17.04.02)
Applicant MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. et al	

- The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR", in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
- This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.
- An asterisk(*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
- The letters "NR" appearing in the right-hand column denote a priority document which was not received by the International Bureau or which the applicant did not request the receiving Office to prepare and transmit to the International Bureau, as provided by Rule 17.1(a) or (b), respectively. In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

<u>Priority date</u>	<u>Priority application No.</u>	<u>Country or regional Office or PCT receiving Office</u>	<u>Date of receipt of priority document</u>
17 April 2002 (17.04.02)	2002-115037	JP	13 June 2003 (13.06.03)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 338.90.90	Authorized officer Farid ABBOU Telephone No. (41-22) 338 8169
----------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------

From the INTERNATIONAL BUREAU

PCTNOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To:

SAEGUSA, Eiji
Kitahama TNK Building
1-7-1, Doshomachi, Chuo-ku
Osaka-shi, Osaka 541-0045
JAPON

Date of mailing(day/month/year) 23 October 2003 (23.10.03)		
Applicant's or agent's file reference P03-20		IMPORTANT NOTICE
International application No. PCT/JP03/04814	International filing date(day/month/year) 16 April 2003 (16.04.03)	
Priority date(day/month/year) 17 April 2002 (17.04.02)		
Applicant MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.		

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this notice:

AU, AZ, BY, CH, CN, CO, DE, DZ, HU, JP, KG, KR, MD, MK, MZ, RU, TM, US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE, AG, AL, AM, AP, AT, BA, BB, BG, BR, BZ, CA, CR, CU, CZ, DK, DM, EA, EC, EE, EP, ES, FI, GB, GD, GE, GH, GM, HR, ID, IL, IN, IS, KE, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MG, MN, MW, MX, NI, NO, NZ, OA, OM, PH, PL, PT, RO, SC, SD, SE, SG, SK, SL, TJ, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this notice is a copy of the international application as published by the International Bureau on 23 October 2003 (23.10.03) under No. 03/088365

4. **TIME LIMITS** for filing a demand for international preliminary examination and for entry into the national phase

The applicable time limit for entering the national phase will, subject to what is said in the following paragraph, be **30 MONTHS** from the priority date, not only in respect of any elected Office if a demand for international preliminary examination is filed before the expiration of **19 months** from the priority date, but also in respect of any designated Office, in the absence of filing of such demand, where Article 22(1) as modified with effect from 1 April 2002 applies in respect of that designated Office. For further details, see *PCT Gazette* No. 44/2001 of 1 November 2001, pages 19926, 19932 and 19934, as well as the *PCT Newsletter*, October and November 2001 and February 2002 issues.

In practice, time limits other than the 30-month time limit will continue to apply, for various periods of time, in respect of certain designated or elected Offices. For regular updates on the applicable time limits (20, 21, 30 or 31 months, or other time limit), Office by Office, refer to the *PCT Gazette*, the *PCT Newsletter* and the *PCT Applicant's Guide*, Volume II, National Chapters, all available from WIPO's Internet site, at <http://www.wipo.int/pct/en/index.html>.

For filing a demand for international preliminary examination, see the *PCT Applicant's Guide*, Volume I/A, Chapter IX. Only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination (at present, all PCT Contracting States are bound by Chapter II).

It is the applicant's sole responsibility to monitor all these time limits.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Judith Zahra
Facsimile No.(41-22) 740.14.35	Telephone No.(41-22) 338.91.11